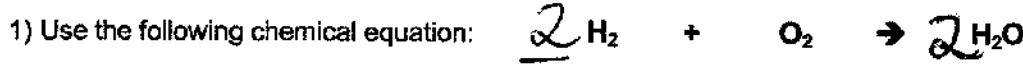


KEY**PROBLEM SET: Limiting Reactants**

A) Balance the equation.

B) Identify the limiting reactant when 1.22 g of O₂ reacts with 1.05 g of H₂ to produce water.

$$\frac{1.22 \text{ g O}_2 \times \frac{1 \text{ mol O}_2}{32.0 \text{ g}} \times \frac{2 \text{ mol H}_2}{1 \text{ mol O}_2} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2}}{\text{O}_2 \text{ is L.R.}} = 0.153 \text{ g H}_2 \text{ needed (excess)}$$

C) What mass of water will be formed in the reaction?

$$\frac{1.22 \text{ g O}_2 \times \frac{1 \text{ mol O}_2}{32.0 \text{ g}} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol O}_2} \times \frac{18.0 \text{ g}}{1 \text{ mol H}_2\text{O}}}{\text{O}_2 \text{ is L.R.}} = 1.37 \text{ g H}_2\text{O}$$

D) What mass of the excess reagent will be left over / unused?

$$1.05 \text{ g} - 0.15 \text{ g used} = 0.90 \text{ g H}_2 \text{ left}$$



A) Balance the equation. ✓

B) Identify the limiting reactant when 4.68 g of Fe reacts with 2.88 g of S to produce FeS.

$$\frac{4.68 \text{ g Fe} \times \frac{1 \text{ mol Fe}}{55.9 \text{ g}} \times \frac{1 \text{ mol S}}{1 \text{ mol Fe}} \times \frac{32.1 \text{ g}}{1 \text{ mol S}}}{\text{Fe is L.R.}} = 2.69 \text{ g S needed (excess)}$$

C) What mass of iron (II) sulfide, FeS, will be formed in the reaction?

$$\frac{4.68 \text{ g Fe} \times \frac{1 \text{ mol Fe}}{55.9 \text{ g}} \times \frac{1 \text{ mol FeS}}{1 \text{ mol Fe}} \times \frac{88.0 \text{ g}}{1 \text{ mol FeS}}}{\text{Fe is L.R.}} = 7.37 \text{ g FeS}$$

D) What mass of the excess reagent will be left over / unused?

$$2.88 \text{ g} - 2.69 \text{ g used} = 0.19 \text{ g S left}$$



A) Balance the equation.

B) Identify the limiting reactant when 5.87 g of Mg(OH)₂ reacts with 12.84 g of HCl to form MgCl₂.

$$\frac{5.87 \text{ g Mg(OH)}_2 \times \frac{1 \text{ mol}}{58.3 \text{ g}} \times \frac{2 \text{ mol HCl}}{1 \text{ mol Mg(OH)}_2} \times \frac{36.5 \text{ g}}{1 \text{ mol HCl}}}{\text{Mg(OH)}_2 \text{ is L.R.}} = 7.35 \text{ g HCl needed (excess)}$$

C) What mass of magnesium chloride, MgCl₂, will be formed in the reaction?

$$\frac{5.87 \text{ g Mg(OH)}_2 \times \frac{1 \text{ mol Mg(OH)}_2}{58.3 \text{ g}} \times \frac{1 \text{ mol MgCl}_2}{1 \text{ mol Mg(OH)}_2} \times \frac{95.3 \text{ g}}{1 \text{ mol MgCl}_2}}{\text{Mg(OH)}_2 \text{ is L.R.}} = 9.60 \text{ g MgCl}_2$$

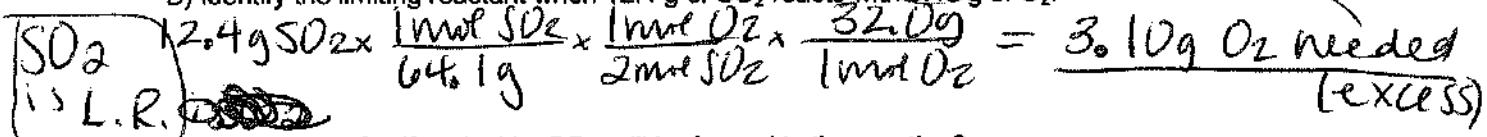
D) What mass of the excess reagent will be left over / unused?

$$12.84 \text{ g} - 7.35 \text{ g used} = 5.49 \text{ g HCl left}$$

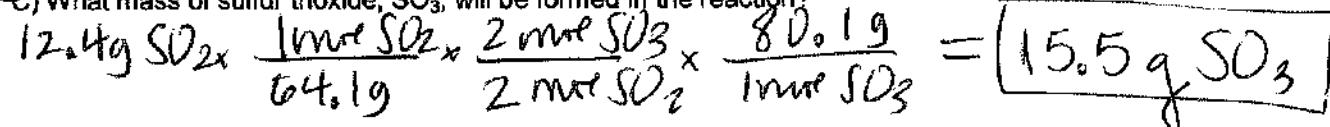


A) Balance the equation.

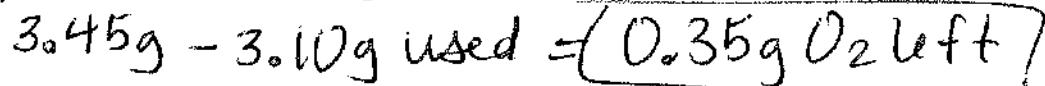
B) Identify the limiting reactant when 12.4 g of SO_2 reacts with 3.45 g of O_2 .



C) What mass of sulfur trioxide, SO_3 , will be formed in the reaction?

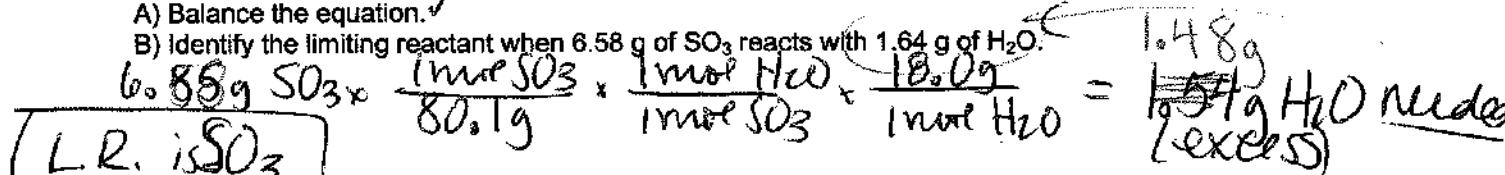


D) What mass of the excess reagent will be left over / unused?

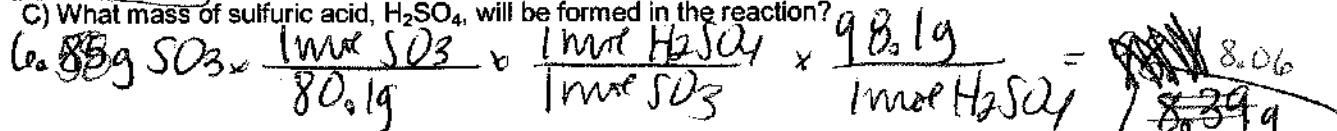


A) Balance the equation.

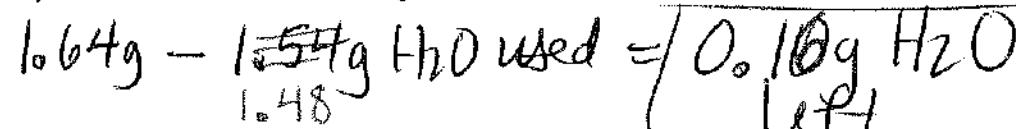
B) Identify the limiting reactant when 6.58 g of SO_3 reacts with 1.64 g of H_2O .



C) What mass of sulfuric acid, H_2SO_4 , will be formed in the reaction?

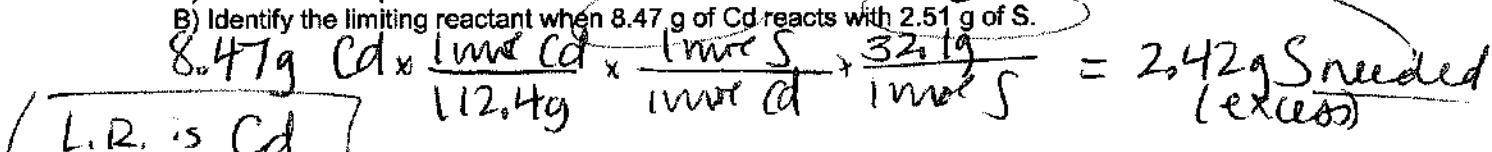


D) What mass of the excess reagent will be left over / unused?

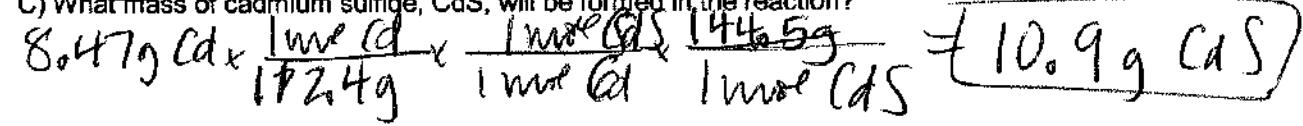


A) Balance the equation.

B) Identify the limiting reactant when 8.47 g of Cd reacts with 2.51 g of S.



C) What mass of cadmium sulfide, CdS , will be formed in the reaction?



D) What mass of the excess reagent will be left over / unused?

